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# PROCEEDINGS

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# American Forestry Association

AT THE

Tenth, Eleventh, and Twelfth Annual Meetings,
Washington, December, 1891, 1892, and 1893,

AND AT THE

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# THE FOREST RESOURCES OF THE ARGENTINE REPUBLIC.

By GUSTAVO NIEDERLEIN, Commissioner of the Argentine Government to the Columbian Exposition.

[Read at the World's Fair Congress, October, 1893.]

Mr. Niederlein presented a very elaborate paper on the forest geography, forest botany, and useful woods of the Argentine Republic, which is to be printed in full from the Philadelphia museums where Mr. Niederlein's collections of Argentine woods have been placed.

We can here only briefly state the principal points made in the paper.

The forest zone of the Republic lies in the northern half of the country, growing richer in species as it approaches the tropics. The area of woodland is estimated at 200,000 square miles, or less than 18% of total area. Of the 500 species belonging to 200 different genera and over 60 orders, about one-eighth are Leguminosæ (like our Black Locust), and in numbers these latter form the predominant feature. Only 38 species reach a height of 80 to 120 feet. No pines are known, the Pino (*Araucaria*) being the only conifer. The Argentine woods are mostly heavy woods and excel by their color, varying through all shades.

One of the heaviest (spec. gr. 1.3–1.4) is the Quebracho colorado, which is perhaps also the most useful, yielding large quantities of tan extract, largely exported, the wood containing from 18 to 25% of tannic acid.

The absence of conifers is felt as far as materials for construction is concerned, although some 50 species adapt themselves to such use; but for manufactures the selection is very varied; outside of the Cedro (*Cedrela*), known as Argentine Mahogany, there is, however, little exported, except to the neighboring forestless countries. The entire commerce in indigenous woods, amounting to about $15,000,000, coming especially from the Gran Chaco and Misiones territory, the northern part of Santa Fe, Santiago del Estero, Tucuman, Cordoba, Corrientes, and Entre Rios.

The woodworking industries are mainly confined to the capital,

Buenos Ayres, with 1,178 establishments, employing over 12,000 workmen, and altogether some 50,000 men are connected in some way with the wood industries.

So far the exploitation is only limited, but naturally wasteful, since the country is sparsely settled and transportation insufficient; the scattered occurrence of the different species adding another element in retarding wholesale forest destruction.

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## TIMBER AS A CROP.

By B. E. Fernow, Chief of Forestry Division, Department of Agriculture.

[Read at World's Fair Congress, October, 1893.]

The object of our forestry movement is twofold, namely, to preserve favorable forest conditions where they are necessary, and to see our forest resources treated as a crop rather than as a mine or quarry from which we take what is useful and then abandon it as a waste, unproductive spot useless to man.

The idea of a crop involves sowing and planting, cultivation and harvest, and when the crop is reaped we expect that it be reproduced and the soil bring forth another crop, as good or better than the first.

Just as agriculture uses the soil systematically and under intelligent direction for the production and reproduction of agricultural crops, so does forestry use the soil systematically and under intelligent direction for the production and reproduction of wood crops.

It is not the intention in this paper to give any technical advice as to how a timber crop may be grown, but to discuss briefly some economic considerations that present themselves to him who would engage in timber-growing. A wood crop differs from an agricultural crop in that it takes the accumulation of the growth of many years or annual accretions before the crop is useful; it is not an annual crop. Hence the financial calculation of cost of production and profit in the harvest depends on uncertain factors of the future. Another important difference from a financial point of view is that the harvest is not determined by any natural period, like the ripening of the fruit or the end of the season of vegetation. It lies with the manager of the crop when he will harvest it, his determination

depending largely on questions of financial import, the quality of material which he can market, or the use to which he proposes to put the crop, and sometimes the methods by which he proposes to reproduce it. For example, if he be a consumer of wood for charcoal-iron manufacture, he would cut his hard-wood crop when it has attained the age of twenty or twenty-five years, expecting its reproduction from the stump again and again—a coppice system with 20 years rotation.

If, however, he were to grow timber for the general market, he would have to wait until his crop had attained such size as will furnish marketable material, and if he expect to reproduce the crop by natural seeding he would have to allow his crop to grow until a plentiful repeated seed production is assured; he would manage his crop as a timber forest with, say, 70 to 100 year rotation; or, if he had a market for box-boards, he might cut his white pine at thirty years, instead of waiting for its full development.

Technically as well as financially the most important distinction between grain or root crops and forest crops, and one which we must impress most strenuously upon our forest-owners, is that a timber crop may be reproduced in acceptable form by the mere manner of harvesting the old crop. If cut under intelligent direction and with proper precautions, the old crop will reproduce itself by the seed from the trees that occupied the ground, and the new crop will start with hardly any effort on the part of the man except a judicious removal of the old crop. All cultivation of the new crop to bring it to more rapid and better development and to improve its quality will then be done also by the judicious use of the axe. The axe, paradoxical as it may sound, is the preserver and cultivator of the forest—not in the hands of the lumbermen, but when judiciously directed by the forester.

If we were to engage in the business of timber-growing we could start from three different positions: either we have a soil without encumbrances, or nearly so, ready for cropping, or we have a well-stocked virgin forest ready for harvesting, or else we have a piece of woodland from which all the good timber has been culled and the poor kinds and poor timber left. Financially I should prefer the second position every time, provided the class of timber composing the forest is of desirable kinds, for with such conditions it is a question of but short time when the forest can be brought into systematic, regularly producing and reproducing condition, yielding at once interest on capital and expenditures for improve-

ments invested. But our friends in the United States—the few that venture into this business—as a rule seem to prefer the other two positions; they choose a poor culled piece of woodland to practise forestry on, as if by the magic of that misused word the cream that has been skimmed from the virgin forest would rise again; or else they plant on new ground, when one would think the expense of the planting, together with the patient waiting for many years ere the crop becomes marketable, would deter them from the attempt, unless other considerations prevail, such as present themselves in the forestless prairie and plains country.

That the more rational method would be to take the crop ready made by nature and apply systematic forest management to that, has seemingly not occurred to those who would try their hand at raising timber crops as a business.

The technical difficulties, to be sure, with such management are greater, and more expert application of forestry knowledge needed, than in planting on new ground, but the returns would not be waited for as long. The curtailment of the present revenue, which is necessary in order to secure not only a continuous revenue but also a property more valuable than it came from the hand of nature, would soon be recompensed, if the conditions are not entirely unfavorable.

Favorable conditions are a forest composed of timbers that are mostly merchantable, and of which one at least, occurring in not too small proportion, is a staple which commands a ready and unlimited market, nearness to a market, and not too great difficulties in obtaining transportation within and without the forest.

Instead of doing as the lumberman would do, culling out all the good timber, usually one kind, *i. e.*, the best, bringing it over temporary roads—as much as would promise good returns—to the mill and abandoning the property when the cream is taken, because it is not worth paying taxes—this is the way in which the State of New York has become owner of nearly a million acres of Adirondack forest—instead of thus skimming the forest, we would prepare to hold and improve the property for permanent investment. This would require, first, the knowledge of what kind and quantities of timber our forest contains and the needs and requirements of the various timbers for their growth and reproduction; then a plan of management would have to be made, in connection with which, after mapping the tract, a system of permanent roads should be laid out. They need not be built at once, but as needed, with a

view to constant use. Next should be studied how the inferior, less marketable timbers could best be utilized. These then should be cut first, judiciously, with a view of reducing them in proportion to the better kinds and of preparing a better chance for reproduction of these.

No profits may come from these manipulations, but these improvement cuttings, and preparations for continuous forest management, even if they cost, are improvements that repay themselves in the end.

When we have provided means for ready transportation, brought the forest into acceptable composition and condition, and have prepared the way for a satisfactory reproduction of the best timbers, then we begin to cut the latter, always carrying on operations with caution and with a view to the needs of each species, so as to secure a new crop, reseeded from the old, before the latter is entirely removed.

You see that forestry does not consist in leaving trees, but, on the contrary, in cutting every one; but when the old crop is all cut, a new one, more valuable than the old, is growing. The lumberman's cutting is usually the very opposite; he does not, as a rule, take everything, but culls the best, leaving the undesirable, and thereby he prevents desirable reforestation, so that he leaves the forest in worse condition than it was before. We admitted that part of the harvest is perhaps not profitable, but the loss must be charged to the improvement and greater value in which we find our property after the operation.

You will also observe that nothing has been said about cutting annually only a certain amount of timber. It is a mistaken notion that therein consists the keynote to European forest management. To take only that which grows annually—the interest on the capital, as it were—is proper financial management but has nothing to do with forestry. The amount to be cut, as far as forestry is concerned, is only dependent upon the needs of the aftergrowth. Hence it is unlike from year to year rather than like, and the very difficulty of the manager is to reconcile the financial and the forestal requirements. The same difficulty arises when the need of thinning the new crop, in order to bring it to more rapid development, is recognized, but the impossibility of marketing the inferior material forbids the operation from a financial point of view.

The question whether timber-growing is a profitable business cannot, of course, be answered as a general proposition; it can only

be answered under special given conditions; but I submit that if it can be made profitable at all in the United States at the present time, it is more readily made profitable in the manner indicated than in any other. If it is not possible to make timber-cropping profitable by buying as a start a well-stocked virgin forest, accessible to large markets, for $5.00 to $10.00 per acre, land and timber, containing a full-grown crop of at least 50% of valuable forest, what should we expect from timber-planting, which can certainly not be done at less than $10.00 to $15.00 per acre in addition to the value of the land, and must wait for returns until the crop is ripe for the axe, compounding the expense all the way from 30 to 100 years, as the case may be?

It is to be hoped that some of our lumbermen and capitalists in whose hands the fate of the forest property of the nation lies may study the possibilities of managing it profitably for continuous timber crops. I am convinced that the time has arrived in many instances when this can be done without detriment to the pocket of the investor, and perhaps with an increased profit, even, during his lifetime.

In this connection I wish to call attention to some important considerations regarding the profit calculations in such a business. Not only is there no safer and, for the large capitalist, more agreeable investment to be found than timber lands; not only can he regularly and at will draw his interest, and, if he chooses, anticipate the same, taking advantage of favorable market conditions, but he will have an investment that is capable of increasing its yield partly by increased material product under management and partly by increased price for the same. In Germany the price for wood has increased during the last 30 to 40 years at the rate of 1.5 to nearly 3% per annum. In Prussia the price nearly doubled in the years from 1830 to 1865, while in the 40 years from 1850 to 1891 it rose 59%, or from 3 cents to nearly 5 cents per cubic foot of wood of all kinds and sizes. And while the cost of management increased also, yet during the years 1830–'79 the net yield of the Prussian State forests increased at the rate of 1.36% per year, in Saxony from 1850–'79 at the rate of 3.02%, and in the Bavarian forests at the rate of 3.14% per year.

These experiences, which are bound to repeat themselves in our country—in fact, have already been had here and there—teach us that, in calculating profits on such investments, we are justified to apply a lower rate of interest than is usual. Interest charges, as

we have grown richer as a nation, have begun to decline, and if Government bonds, on account of their safety and the ease with which the interest is collected, bring only 4% and less, the compounding of interest charges on forest property, which is as safe, and increasing in value, may be done at even a lower figure without involving financial miscalculation.

In conclusion, while, as we have said, the usefulness of a timber crop arrives many years from its start, it nevertheless has a value at any time, just as the colt has a value derived from the promise of its future as a mare, and as surely as virgin forest supplies are being consumed at a rate which exceeds twice the capacity of the existing area to produce, as surely will thrifty growing timber increase in value.

Now is the time for the long-headed lumberman to begin to treat his timber as a crop!

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## RELATION OF FORESTRY TO THE LUMBERING INDUSTRY.

By Met. L. Saley, Editor *North Western Lumberman*, Chicago, Ill.

[Read at the World's Fair Congress, October, 1893.]

The "Relation of Forestry to the Lumbering Industry" is practically, so far, very meagre. In the hard-wood districts, when a mill man hunts up and buys trees which will produce exactly the kind of stuff he desires, cuts, hauls them to his mill and saws them, he is following the teachings of forestry, though nine times in ten unwittingly. So, in the yellow-pine fields, when a saw-mill man has an order for timber, and selects the trees from which the sticks may be sawed to the best advantage, he is carrying out some of the ideas of the forester. Forestry, in the sense above designated, as I understand it, means the handling of timber to the best possible advantage, due attention being paid to the matter of selection, the prevention of waste, and the preservation of young trees. Any one acquainted with American lumbering methods knows they are not hampered with any such conditions.

Between the great bulk of lumbering business and forestry there is at present no actual relation, and it may be readily seen why there is none. There is no more rushing, pushing business than

the manufacture of lumber. Great bodies of timber are cut as rapidly as possible and fed to the saws. It is a sweeping wholesale business, and the lumberman in pursuing his work has an eye as single to the job before him as has the big Western farmer when superintending his harvesters, intent on gathering his thousands of acres of wheat. The saws are run strictly on business principles and for the purpose of putting the last dollar possible into the pockets of the men who operate them. Connected with forestry, as so far conceived by many of its friends in this country, there is sentiment, but there is little of that article touching his occupation harbored by the lumberman. He is not in the business for a lifetime, much less for the benefit of future generations. Ask the majority of manufacturers, and they will say that in five, eight, ten, or a dozen years, as the case may be, their timber will be exhausted and they will then retire. It is easy to understand, it appears to me, why a man doing this rushing business for the purpose of gaining a competency in a few years should not seriously consider the question of forestry or any other question, especially when the working of it out would tend to block his operations. Interest is the great motive that controls all of us, and in forestry the lumberman feels no direct and immediate interest, the present only being considered.

City people, to whom forests are poetry and a comfort, are quite unable to understand the subject from the standpoint of the lumberman. Those people read in the press thrilling accounts of disastrous forest fires—as a rule more disastrous in print than in reality, for which let us be thankful—and rightly regard them as calamities, as frightful cancers which eat away and blacken sections of the fair face of nature. They little know, however, that this great sin against forestry—forest fires—is condoned by the lumberman. Few things affect his interest more directly, one would think, yet apparently it is a matter of supreme indifference to him whether forest fires rage or not. When he has seen them coming full headway for his mill, or the town in which he lives, he has been frantic in an attempt to assemble his neighbors for the purpose of trying to extinguish the flames. But what pains have been taken to prevent these fires? In the white-pine territory, where they are most destructive, not only to timber but to settlements and human life, I have never known but one operator to burn his debris under supervision, and thus protect his own property and that of his neighbors. Often any kind of protection would be of no value to the operator who has laid the train which, sooner or later, will be fired. He has cut

every stick of valuable timber of his own, and the timber standing next to his leavings belongs to his neighbors.

Here comes in the legal aspect of the case, and it is most surprising that the courts have not been asked to give their opinion regarding it. In common law, if a man desires to pile, without protection, combustible material on his lot adjoining one on which stands a neighbor's house he may do so, but he will be held accountable, in case of damage, for such loss as might naturally result from his negligence. If an operator permits the leavings of a logging job to collect and dry alongside of the timber of another man, there is little question but in law the operator would be held responsible if the timber was damaged as a result of the fire originating in the powdery brush-heaps. Yet so universally is it held in logging circles that forest fires are a natural consequence that never, to my knowledge, has a suit been brought for damage as a result of one. If there is the slightest suspicion that sparks from a locomotive or steam-tug set the lumber in a yard on fire, litigation is sure to follow; but if a man permits his inflammable refuse to accumulate, and as a result there is a sweeping conflagration that does more damage than half of the lumber-yards in the State are worth, not even blame attaches to him. This utter disregard of this phase of forestry—the prevention of forest fires—is as deplorable as it is unaccountable. The plea of the operators is that it would not be possible to so care for their debris that the great danger of forest fires would be materially lessened. They really mean, when they say this, that the expense of such care would be greater than they would like to bear.

It is not surprising that little thought was given to the preservation of timber by the men whose names are prominently recorded in lumber literature. Few can see beyond the horizon, and these men knew not where the great stretch of forest ended. The reports of the Government surveyors were not in. The land looker who has since compassed the timber world had not won his laurels. More now is known of the timber supply. There is timber in large quantities—in the South, on the Pacific coast, and even as yet in the white-pine States—but reflect how insignificant the amount when the demand is considered, and when we are aware that the present enormous consumption, on the basis that population increases 1,000,000 a year, will increase at the rate of 500,000,000 feet annually. There is enough timber for us during our remaining years, but with each of us it should be a sacred wish that this great nation, of which we are a part, may live on and on for centuries and prosper; and

how much it would add to that prosperity could it all along have at hand the great and rich timber resources which it has been able to command since its life began. But those resources it will not have. At the present rate of the manufacture of lumber, allowing 6,000 feet of timber to the acre, an area is stripped yearly equal to that of Vermont, New Hampshire, or Massachusetts. This is for lumber and shingles alone, and does not include the output of timber for fuel, mining, or railway track purposes. We have children who will see the great forests of the United States, excepting perhaps those of the extreme west, practically cut away. What then? You answer, and see if you can derive consolation from any answer you may frame.

Regarding this brittle and almost imperceptible thread that at present unites forestry and the lumber industry, we should bear in mind that forestry in this country is a comparatively unknown subject. Possibly, were lumbermen to know more about its advantages and possibilities, they would at times profit by it to a greater extent than they do.

In the future there will be a decidedly intimate relation between forestry and the lumbering industry, but it will be when the hum and clatter of the great commercial mills will have nearly died away, as then there will be but few great bodies of timber from which such mills may be fed. As men now plant corn and wheat for food, so by and by they will plant trees for the needs of their children and their grand- and great-grand-children. How to cultivate trees will be taught in our colleges and universities, and the true relation between forestry to the lumbering industry—the one providing the crop which the other utilizes—will be established.

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## RELATION OF FORESTRY TO LUMBERING AND THE WOOD-WORKING INDUSTRIES.

By J. E. Defebaugh, Editor *The Timberman*, Chicago, Ill.

[Read before the World's Fair Congress, October, 1893.]

As the purpose of this congress is to develop a complete and comprehensive view of the subject of forestry in its two correlated departments of forest preservation and forest culture, through the presentation of various phases of the subject by men of practical

knowledge and experience in them, I have been asked, not as a practical lumberman, but as editor of a newspaper of the lumber trade in touch with all its branches, to treat of this peculiarly practical and matter-of-fact topic, "The Relation of Forestry to Lumbering and the Wood-working Industries."

What I shall have to say must be in the nature of an explanation and partially of an apology. The individual lumbermen and wood-workers as such have no interest in the subject of forest preservation and culture. As citizens, and therefore interested in all movements looking toward the good of future generations, they may give attention to the considerations you would urge, and assist in the furtherance of your objects, but as business men you cannot appeal to them. This being the fact, as I shall show later, why then consider the relation of forestry to them? Why not at once drop this branch of the subject? Simply because the reasons why lumbermen are not directly interested are economic and financial ones on which hinge the possibility of accomplishing your purposes, and a brief statement of them may more clearly set before forestry specialists the practical difficulties with which they will have to contend in this country, and therefore more fully arm them in advance for the battle which must be waged for more than one generation before their laudable objects shall be fully accomplished.

Much invective has been wasted in denunciations of the attitude of lumbermen towards the forestry problem. To those who attend forestry congresses or read the literature concerning the subject, which of late has occupied so conspicuous a place in the public press, no phrase is more familiar than this, "the ruthless destruction of our forests." That word "ruthless" seems to define the mental and moral attitude of the lumberman towards the subject under consideration. So violent and unreasonable, in many cases, have been the charges against him that the lumberman has often been forced to an attitude of apparent hostility, that misrepresents his real feeling, which is one of entire indifference. The invective is misdirected and wasted, because the lumberman, as such, is not any more responsible for the bad results of his business than is the banker, the grocer, or the farmer. He is but part of a commercial and industrial system the blame for which must be divided among the fifteen millions of our voting population, and comes even to them as an inheritance.

The time was when a great part of the territory of the United States was under control of the Government—that is to say, of the

people as distinguished from individuals. Then was the time when great bodies of timber-bearing lands might have been forever set aside to public uses, or transferred to private hands with a reservation as to the use that should be made of them. But no such policy was adopted, the public domain became private property, and the very basis of our political and social organization is the basis of these property rights, which cannot be disturbed without a revolution in the accepted order of things, which will not be effected in this generation, if ever. Private property must be taken if adequate timber reservations are to be secured.

I do not forget the timber reservations which the General Government and States have established, but they are so small in comparison to the whole area of the country and to the great results to be subserved by forest preservation and reforestation that in this discussion they can be ignored. It is gratifying that in California and other States great reservations have been made which will prove of inestimable advantage to the people; but the forests covering the head waters of the great rivers of the East and of the interior are already in private hands. The most vital points present the greatest difficulties to those who would preserve the forest cover. It is, according to forestry theories, of the utmost importance that the head waters of such rivers as the Mississippi and Ohio, with their chief tributaries, should not be denuded of their shade, and yet it is just these birthplaces of the rivers that are most completely under control of operating lumbermen or investors, and which it is least practicable to bring again under the control of the Government on account of the cost.

I lay down this proposition: that it is not within the power of the General Government to preserve any such portion of the virgin forests as would result in any substantial benefit, for the simple reason that even the resources of this rich Government would fail in an effort to purchase the timber cover of the head waters of these streams, and the Government is restrained by its very nature from taking possession of them without due remuneration to their present holders. The question may be asked if the Government cannot consider timber holders who produce by the use of their property a condition of things damaging to the best interests of the whole people and of future generations as having no right to such possessions, and to practically confiscate them.

Let us look at the situation from the lumberman's standpoint. The Government, which was formerly the owner of the immense

forests of the central and western portions of this country, in which lumbering operations are now most actively carried on, put these timber lands upon the market at an inviting price. Immigrants were wanted, settlers were wanted, and all facilities were put in the way of those who would develop the natural resources of the country. Therefore, the man whose education or inherited aptitude made him a lumberman purchased these lands, proposing to utilize them, or is now in possession of them after they have passed through many hands since the original purchase, at a price due to the years of accrued value. The present holder has thousands, possibly millions, of dollars invested in lands, in timber, in appliances for bringing his timber to a point of manufacture, in mills and all the other paraphernalia for the conduct of what is known as the lumber business, for the production and sale of a merchantable commodity which is demanded by the people of the country. He has been encouraged by the nation, by the business customs of the community, and by the demand of the people at large; for the lumberman is the home builder, and with the railroad and the frontier settler has been, and is, the pioneer of our American civilization. His operations have made the settlement of our prairies possible. The history, law, customs of the country, all justify his ownership and secure him in it.

It is unfortunate that the amount of standing timber in the United States is not and cannot be known, but to illustrate the magnitude of the task which the Government would undertake, in establishing the forest reservations at the head waters in the white-pine country of Michigan, Wisconsin, and Minnesota, of such magnitude as to really accomplish the results at which forestry advocates aim, let us assume that there is only 50,000,000,000 feet of standing pine timber still left in those three States. There is undoubtedly a much larger amount than that, but if that were all, and if it were valued on the average at only $3 per thousand feet, board measure, it would make the total value $150,000,000. It is the common belief, largely justified by the facts, that the white pine is almost gone, and in truth it is only a fragment of the original forest which still stands. So small is even this great amount that much more land than this would be necessary to give a proper amount of forest cover to the head waters of the Mississippi and the streams that supply the great lakes, and that is only one of many important sections where the same work is to be done.

If we admit that absolute ownership by the Government is im-

possible, what shall we say as to the practicability of establishing such regulations for the use of timber as would preserve the forests still standing, allowing their owners to only cut mature timber, and by careful treatment to preserve the life and usefulness of the forests perpetually? It is a question if such a measure as this comes within the province of the Government of the United States; but, on the ground of eminent domain, right might be established either in the general or State governments. The lumbermen would have no objection to such supervision if they could be assured that their competitors in all sections of the country would be treated alike, and provided, also, that they were reimbursed for the loss of value which would be occasioned thereby. But here, again, there are many factors to be taken into consideration. Take the individual operator and consider the circumstances under which he is doing his business. He is in the lumber business to make money out of it if possible.

In the white-pine region of the Northwest the cost of timber to a man who is now operating has been so great that it is only by the utmost economy of operation, the most careful manipulation of the product in the mill and on the market, that he is able to make a reasonable profit. These conditions lead to methods of operation which under ideal circumstances would not obtain. In order to get his logs from the forest to the mill in the most economical fashion, and to fully utilize his investment in standing timber, he must cut his land clean as he goes. Everything that will pay for transportation and manufacture must go through the mill, for the fixed charges of a small logging operation are almost as great as a large one, and it costs but little more to take all the timber above eight inches in diameter on a tract of land than to take merely the matured trees. Moreover, the lumberman is threatened constantly by multiplied dangers. He is more keenly alive to the ravages of forest fires than is any forestry enthusiast, for he not only has a sentimental interest in them, but a practical one, as they may wipe out a property which represents years of active business life.

The lumberman, as an individual operator, cannot afford to clean up his lands after him. To gather the debris from his logging operations together and burn it safely would cost so much as to put him out of competition with his neighbor. Moreover, if he were to adopt such policy, the danger is not much lessened, for he is surrounded by other operators who may be less careful than himself. Further, the forest is honeycombed with the clearings of set-

tlers, who are more anxious to put their land in shape for tillage than they are to preserve the timber holdings of their neighbors. The timber-owner is threatened not only with this danger of fire, but other perils which are entirely natural and exist in any primeval forest, and with others which necessarily accompany lumbering operations however carefully they may be conducted, and the settling of the country by agriculturists. A clearing made will deaden the timber for some distance around it; rot and insect pests accompany the settler as well as the lumberman. Under the present circumstances, therefore, the lumberman in the majority of cases could not, if he would, conserve his possessions, but must transfer his forest holdings as rapidly as possible into commercial products, which in turn can be transformed into some other form of wealth. It is evident that little can be expected from the lumberman or timber-owner who depends upon that business for his livelihood in the direction of conserving the forests, simply because it does not pay him.

If, for instance, a tract of 100,000 acres virgin timber land in Wisconsin, with 7,000 feet, board measure, of pine per acre—a stand above the average—were bought for $5.00 per thousand feet, the capital thus invested would be $3,500,000.

The cost of conducting the lumber business from the tree to the market may be estimated at $7.50 per thousand feet. Assuming the high average price of the product at $15.00 per thousand feet, the profit would be $7.50, which could be realized as quickly as the market will allow. But if the tract is to be kept in perpetual production, the cut is limited to, say, 20,000,000 feet per year, and the expense of improved methods and care increases so that we can only assume a profit of $6.00, the total net profit of $120,000 would represent less than 3½ per cent. interest on the investment.

The conclusion, so far as the lumberman is concerned, seems to be plain and inevitable—that it is not, under present conditions, within his power to carry out any policy of forest preservation or culture; and that whatever is to be done must be by the people as a whole, with due regard to the property rights of the individual.

A word as to the relation of the wood-worker to this question. Directly he has nothing to do with it, for he purchases his materials in the open market, and if such forestry measures were adopted as would raise the price of them, his competitors would be equally affected and his comparative position remain unchanged. But here enters a consideration that from a politico-economic view should

not be ignored. What would be the effect of a considerable increase in the value of our forest products on the multifarious form of enterprise into which they enter? What would be the result to the already heavily burdened farmer of the West if his houses and barns, and his agricultural implements, and the wagons and railway cars in which his products are transported were made more costly? What to our furniture exporters, if a substantial increase were made in their chief material? What to our oil export trade, if cases and barrels advanced in price? What to the paper trade, if wood-pulp were difficult to obtain? But the list is endless.

Here I wish to state what seems to me an axiom. I do not venture to claim originality for it, and yet I do not remember to have seen it in this form. It is this: No nation can husband a chief resource. If I am right in calling this an axiom it should not need explanation or amplification, but I am tempted to illustrate it. A chief natural resource must be comparatively plentiful and cheap. It is that in respect to which one country is superior to another. If its comparative cheapness should be artificially done away with—or, in other words, if the natural effect of its plentifulness should not be allowed to occur—then it would at once cease to be a chief resource. The United States is an exporter of wheat because of its vast area of natural wheat lands, valued at a low price, on which wheat can be cheaply raised. If the wheat-raisers were required to maintain the strength of the soil by artificial means the advantage would be lost. Similarly with the cattle trade. If the ranchman of the plains were required to breed and care for his cattle after the English fashion, we would no longer be able to supply Europe with cheap meats. So with forest products. If the lumbermen were obliged to adopt German methods of forestry we could not longer occupy the superior place we do in the markets of the world.

Conversely, where wheat lands are scarce, fertilization is profitable; where grazing lands are limited, the quality of the products can make amends for the small quantity; where the forest area is small in proportion to population, forest culture is feasible.

Where men and not materials are the chief resource of a country, there men are cheap; where natural resources are abundant in proportion to population, there these resources are cheap and men are dear.

The difficulties in the way of an adequate forestry policy in this country are thus seen to be financial and political, and are expressed very clearly in the relation that forestry bears to the lumber and wood-working industries.

It would be somewhat ungracious, as well as unfair, to close this paper, so occupied with arguments against the practicability at any early day of putting into effect an adequate forestry system, without mentioning some directions along which effort might have more chance of success.

In the first place, the illustration chosen of operations in Wisconsin is an extreme one, and yet justified by the fact that the most important head waters of the Mississippi lie in that State and in Minnesota. In some other sections conditions as to value of timber and methods of conducting the lumber business are very different. The whole Southern lumber industry is conducted on a much lower valuation of timber, and in hard-wood regions, like that great cradle of rivers, the mountain section of Kentucky, Tennessee, West Virginia, and the eastern parts of Virginia and North Carolina, operations are now conducted in some respects after the method which would prevail under supervision of a Government forestry department. There is no such clearing of land as prevails in the white-pine country. The timber is largely treated as individual trees instead of in masses, and is often purchased separate from the land.

In the particular section referred to, it would be comparatively easy for the Government to obtain sufficient control of the forests to accomplish direct results in preserving the forest cover. The chief difficulty would be with the small farmers and mountaineers, who have but little regard for property rights in standing timber, whether those rights are exercised by Government or by individuals.

Opportunities to establish timber reservations in the white-pine region of the Northwest at a non-prohibitory expense arise as the lumberman finishes his timber-cutting operations. There is then left but little that is, under present conditions, of value. In multitudes of cases the lumberman abandons his denuded land, which eventually is sold for taxes. Millions of acres of one-time pine lands can now be bought in Michigan and Wisconsin at not to exceed $2 per acre, and in many cases the State could secure them on remittance of taxes. There is much of this land that is either worthless for agricultural purposes or of so little value that the population of the country must be much more dense than it is now to encourage its use.

On these abandoned and barren tracts a grand experiment might be attempted in the culture of white pine (*Pinus strobus*), a tree whose superior in general utility does not exist, and which, under

present conditions, is fast disappearing. It is a firmly held belief among lumbermen that the white pine cannot be reproduced on the soil it once occupied in great forests. But I believe that scientific methods would avail to reforest the plains and hills of the Northwest with this noble wood, and prepare for our children's children a vast storehouse of forest wealth that would remain for all time.

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## THE RELATION OF RAILROADS TO FORESTRY.

By Howard Miller, Gen. Agent Union Pacific Railway.

[Read at World's Fair Congress, October, 1893.]

The successful agriculturist is one who raises a crop and has in mind not only its immediate disposition, but the continuation and improvement of the conditions that rendered its production possible. There is no more elementary fact in the hornbook of the husbandman than that he may not take from the earth without corresponding return of measure and kind. Robbery of the earth entails certain beggary not only upon him who takes, but upon the earth itself. He may overdraw on Nature's bank, but sooner or later his drafts are protested. We speak of inexhaustible fertility, but there is no such thing in nature. Like unlimited credit, it is only a phrase embodying a later day of reckoning.

The centuries have taught the most illiterate that if he would reap he must sow; that there can be no succession of harvests without previous seed-times. As palpable as this fact is, as far as the individual is concerned, it is all the more remarkable that the State is just beginning to recognize it as equally applicable to the higher forms of vegetation. No man listens to the whir of the reaper without a knowledge of the drill that preceded it, and which must follow to ensure the next crop. Yet most men will hear the echoing thud of the woodman's axe, the crash of falling timber, and view the busy mill scene without a thought of the restoration nature will exact if want is to be kept from posterity.

It argues ill for our intelligence that we view with regret the barren field that has been cropped to sterility, and look with complacency on the denuded forest where once, within our recollection, were Gothic arch and "God's first temples." The man with the

axe lays low the gift of a century, and usually has thoughts abou it differing as little from those of his prehistoric ancestor as their tools of destruction vary in form. No border clan ever returned from successful foray and left behind such a blank array of material destruction as the logging camp on the edge of the stream leaves the next generation.

The existence of the industries that live directly and indirectly through this slaughter is not deprecated. On the contrary, they are the necessary concomitants of civilization and progress, but it is in the thoughtlessness for the future that not only the scientist but the political economist finds food for grave reflection. The end of the forests of this country is in sight. Whatever bears on their destruction is of equal importance with the facts relating to their perpetuation and preservation. Of all the destructive and insatiable agents contributing to the depletion of forests, perhaps none are more voracious than railroads. Before a wheel can turn a tree must die. Every railroad in the United States represents the death of a forest, the extent of which is not apparent on first thought.

In round numbers, the railroads of the United States represent about 225,000 miles, with the annual addition of about 5,000 to 6,000 miles of new road. These roads require not less than 2,500 ties to the mile. A good tie is not less than 8 feet in length, and a tree 1 foot in diameter and 25 feet from the ground to the first limb would cut from its trunk 3 ties. This estimate is lower all around than the facts in practice. The totals are sufficiently appalling at these modest figures. A forest of 800 trees would probably furnish ties for one mile of railroad, and at this rate the railroads of the United States would require 180,000,000 forest trees of the most valuable kinds for ties alone.

The life of a tie varies, but may safely be placed, at the very outside, at 10 years, when, owing to increased mileage of track, more than 180,000,000 trees of the dimensions named will again be required to relay the roads. Of course, this renewal every 10 years is not literal, yet each year sees not less than 10% of the ties replaced, and at the end of the period not less than 180,000,000 forest trees find their graves under the iron highway. These enormous amounts confuse the reader, and to summarize in such a way as to render intelligible the results, it may be said that the railroad construction of the United States has used up one-fifth of the forest area of the country.

A U. S. Government report of 1887, on a basis of 187,500 miles of track, much too low for the present year, estimates the amount of timber used by the roads, for ties alone, and at present undergoing decay, at 1,485,000,000 cubic feet, and for the same mileage of track 375,000,000 cubic feet for bridge and trestle timber, making a total of 1,860,000,000 cubic feet. Add the telegraph poles and other timber used by railroads, and the forest necessary to furnish the annual consumption by its annual accretion would measure 100,000,000 acres. (See Bulletin No. 1, Forestry Division, United States Department of Agriculture.)

It would appear on first consideration that the supply of ties at the present would be so diminished as to be a source of alarm. On the contrary, the supply is equal to the demand, and the prices are not much higher, if any, than heretofore. This does not mean an increase of forest area. It results from the division of the land into smaller holdings and the incident clearing of timber land by the purchaser and the consequent offering of ties to the nearest railroad. Then the south, with its vast forest area, and cheap land, and cheaper labor, furnishes great numbers of ties at prices which fairly compete with the northern-grown product. Of course, the end of all this is clearly in sight.

Recognizing the eventual commercial value of a substitute for wooden ties when they are no longer available, the inventive genius of this country has produced 516 patents of metallic ties and stringers. They have not met with general favor from corporations because of their great initial cost and their imperfections compared with the perfect wooden tie which holds the alignment of the road, and possesses the elasticity and noiselessness sought. That this is the case now does not imply that in the future the iron or steel tie may not supersede the wooden one. In fact, it is not generally known that there are over 30,000 miles of railroad operated on metallic ties. Experiments have been made on the New York Central Railroad where, for three years, 800 ties have been used on the main track with great satisfaction in every respect. The 800 cost $25.00 for maintenance in 1892. This road has 18,000 metal ties which it expects to place in the main track this season between the Grand Central Station and Harlem river.

The solution of the timber question as related to railroads clearly lies in the substitution of metal for wood, and, when the economic conditions compel attention, metallic ties will doubtless come to the front as the proper and natural material to take the place of wood.

Nothing better illustrates the field open to practical statesmanship than a picture of actual conditions that may be seen any year in the United States. In the eastern portion of the country, in a forest that sheltered the red man, the rugged oak and the sentinel pine crash to the earth with shattered limbs and broken heart at the stroke of the axe in the hands of the woodsman. From the fallen trunk are shaped the railroad ties that feed the insatiable juggernaut of the vegetable world. The limbs and debris of the woeful ruin are heaped in piles, and when the night is calm the skies are red lit with the burning brush in the clearing.

A thousand miles westward a man sits by his door unsheltered by vine or tree. Soil of unequalled fertility is about him in every direction. The iron highway stretches away in the distance across the prairie, bearing its burden from ocean to ocean, but for a hundred miles not a tree is in sight. Earth and blue sky join hands in the horizon, but the shadows on the buffalo grass are those the clouds make. In his stove and on his hearth blazes the yellow corn, for there is nothing else to burn. The man in the eastern forest strove with his axe that he might fill the meal barrel in his home. The man on the plains strove with his plow that he might harvest the yellow corn, and now he burns it for lack of wood that the railroad tie-maker destroyed in an hour. Between the two the iron highway leads. It is a necessity to both. It is indispensable, yet there exists between the two sections a disparity of resource that may well awaken thought and suggestion of remedy.

If it were possible for the average railroad corporation to engage in the culture of timber for its own uses, there are sections of the United States where such a course is practically impossible. It is not likely that any railroad corporation will engage in the culture of timber, it being cheaper to buy from those who have to sell than to engage in production. If such a period does eventually arrive it is not yet in sight. In fact, with some roads the practice on the purchase or acquirement of a piece of woodland is to give the timber to those who will cut it down and take it away.

Laying aside all diplomatic verbiage and setting forth the facts with photographic accuracy, it may be broadly stated that railroad managers, as a rule, do not care for the future of forestry as much as for the returns of to-day. A railroad corporation is not a charitable organization, nor is it in the field for philanthropic purposes. It is organized upon the basis of money contributed in large and small amounts, in the hope of profitable and immediate returns

upon the investment. The management is in the hands of men deemed peculiarly fit to produce the results sought. Their tenure of office is dependent on reduction of expense and expansion of income. The writer believes that any railroad management in the United States, acting for a moneyed constituency, which would set aside any considerable portion of the company's funds for the purchase of land and the culture of timber with the consequent expense and waiting for years for even partial realization, would find itself promptly set aside for men who would create dividends to-day for the present living stockholders and leave the next generation to take care of itself. The situation is neither defended nor deplored. It is stated for the fact that it is.

In the prosecution of any great public good, the roots of which lie in present inconvenience, there must be back of it one of two things, either the understanding and good-will of people affected thereby to the extent of co-operation, or some very drastic compulsory legislation, and before any really active work can be expected from corporations in the line of timber culture, a vast deal of missionary work lies between the idea and its consummation. This fact does not arise from any lack of intelligence on the part of corporate management, but is caused by the refusal of that sensitive entity known as capital to surrender any present certainties for future benefits to people yet unborn. The situation may be, and, undoubtedly is, a sad commentary on civilization, but it is the hard fact against which the tree man, working *pro bono publico*, must contend.

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## THE RELATIONS OF THE STATE TO FORESTS.

By Joseph B. Walker, Concord, New Hampshire.

[Read at World's Fair Congress, October, 1893.]

The forests are among the most important resources of most of the States, and each is in duty bound to protect these as well as any other destructible property. One of the greatest dangers to which these are exposed is fire.

In 1880, forest fires swept over 10,274,089 acres in the United States, causing a loss of $25,462,250. That these occur to a greater or less extent every year is due to the fact that no sufficient means are instituted to prevent them. The individual owner may be ever

so careful, yet, if his woods are exposed to the dangerous practices of careless neighbors, hunters, campers, and others who do as they like, he is helpless and liable to suffer serious loss at any moment.

Prevention of fire is to be found in the enactment and enforcement of wise laws upon the subject by State authorities. If such, where they already exist, are found ineffective, it is quite often due to the insufficiency of the penalties which they provide and to a public indifference to the injury or destruction of wooded property by fire. This indifference will prove surprising to any one who will give to it a little attention. He will find that, while the burning of an isolated structure worth five hundred dollars, or even less, will draw together a large collection of people, the conflagration of a timber lot worth five thousand dollars, or much more, on the confines of that town will be of but little interest to any one but its owner or to the proprietors of adjoining lots endangered thereby.

A recent experience of the writer illustrates this general apathy. A fire which broke out on the edge of a wood lot belonging to him endangered a small cottage and barn near by. An alarm was given, and one or two fire companies responded. When they had extinguished all fire near the buildings, and so wet the ground as to avert further danger, they considered that they had done all required of them, and made preparations to leave the scene, although the fire was still raging in the woods close at hand, and liable, if not extinguished, to run over a thousand adjoining acres. When remonstrance was made and a detail asked to aid in the fire's arrest, the foreman replied that he was unaware that he was authorized to fight a fire in the woods. An explicit demand for help, on the ground that the property then burning was taxed towards the support of the department which he represented, was required to secure the aid asked for. But this foreman could hardly be blamed, inasmuch as he faithfully reflected the prevailing indifference of the public opinion around him. Since this occurrence, however, the attention of the general court of New Hampshire has been called to the subject and a statute enacted in which provision is made for the better protection of forest property.

If it be objected that the wooded sections of a State are generally sparsely populated, and that efficient protection may prove difficult, it can be said, in answer, that the ægis of a State is commensurate with its utmost limits, and that it is no more difficult for a fire warden to discharge his duties in such localities than it is for a county commissioner or deputy sheriff to execute his.

Thus far there has been no such thing as forestry in this country. Until recently the need of it has been but little felt. Statistics show that our primeval timber supplies have not yet been exhausted. Nature, too, has been and is reforesting many sections formerly denuded, wholly or in part. But the time is not distant when a more rational treatment of our forests will be absolutely essential to a home supply of wood and timber.

The States should be the first to see this fact and to provide means to secure it. One or more schools of forestry like those abroad should be instituted by each, or special courses for the teaching of its principles and practice established in existing institutions. This would result in a speedy improvement of the management of wooded property, and in season, perhaps, to save the country from the timber famine which it is sure to experience if the present reckless system of forest destruction is continued for another generation. Our woods are yielding under nature's tutelage but a fraction of what they might produce under skilful culture. It is as idle to trust for a satisfactory crop of timber to nature's capricious sowing of the necessary seeds as it would be if one sought in that way a crop of maize or wheat. God's primal curse of the ground evidently meant that it should thereafter yield its higest returns only in response to man's wise control of its potencies.

We do not hesitate to urge the acquisition by States of tracts of forest to be held for the conservation of their water power, the amelioration of their climate, the preservation of their scenery, and for the instruction, largely by object-lessons, in good forestry of their people. Aside from the benefit thus derived, these may be made to yield a fair return upon their cost and maintenance.

Some three years ago a bill passed the New Hampshire senate, but failed in the house, directing the Forestry Commission to consider and make a report to the legislature at a subsequent session upon the advisability of devoting to a State park that part of the White Mountain region known as the Presidential Range, in which are situated Mount Washington, Mount Jefferson, Mount Adams, and Mount Monroe, with their foot-hills and intermediate valleys, occupying an area of some thirty square miles. While to many the proposition may have seemed chimerical, its realization at a date not distant should not be surprising to such as are cognizant of the fact that ten millions of people, and more, live within a twelve hours' ride or less of this locality.

Were all the scenic attractions of this region made accessible to view by additional paths and roads, the present large number of visitors would be greatly increased. Were the principles of an enlightened forestry applied to the management of the great forests concealed in its recesses, they would yield fair pecuniary returns and continue to serve the other offices which they now render.

In each State suitable forest reserves in which well-kept roads and paths render accessible fine views and streams, quiet valleys and mountain summits, as well as dense forests kept perpetually attractive by intelligent care, might be made very largely, and perhaps entirely, self-sustaining, and would furnish a blessed sanitarium to the thousands who would be sure to frequent them. But such must, in most cases, be established and maintained by the particular States within whose limits they are situated, and as State possessions.

Every State should have a well-digested code of forest law. Until such has been provided, the treatment of its wood and timber lands will be irregular, and very often adverse to the interest not only of the public but to that of the private owner as well. But such a code cannot be devised and enacted at once. It must embody the suggestions of local experience and grow to perfection by degrees, just as the irrigation codes of southern Europe and the railroad codes of this country have done.

The devise of such a code is the more difficult inasmuch as our forests are generally the property of private owners, and to a small extent only belong to the State. The State of New Hampshire does not own a single forest acre. When, therefore, individual owners see fit to pursue a course of management which may be detrimental to the other great interests of the State, and its protection is invoked, intricate questions will be likely to arise, to the temporary perplexity, perhaps, of its courts. And just here it may be said that this Association will confer an inestimable benefit upon the forestry interests of this country by preparing and scattering broadcast a digest of the forest laws of the several States so far as such exist to-day. Imperfect as these may be, they are American and suggestive. Side by side with those of older countries, they would aid greatly in the construction of a system for general use with us. It would be unwise to copy without careful examination laws that have grown out of the experiences of peoples living under different traditions and differently ruled. Ours must be American and answer the demands of the new environments of a new people.

# THE BEARING OF ARBOR DAY AND VILLAGE IMPROVEMENTS ON FORESTRY PROBLEMS.

By B. G. Northrop, Clinton, Conn.

[Read at World's Fair Congress, October, 1893.]

Arbor Day and Village Improvements are wisely grouped together in our program, for both alike aim to benefit the school, the home, the town, and the State. The former was started in Nebraska in 1872 by Hon. J. Sterling Morton, whose able advocacy resulted in marvellous success from the first. The settler who now does not plant trees is the exception. The Nebraskans are justly proud of their great achievement in this line and are determined to maintain their pre-eminence.

Arbor Day in school is a child of the American Forestry Association, which eleven years ago adopted a resolution in favor of such an observance in all our schools, and appointed a committee to push that work. Its first efforts were not assuring. The indifference of governors and State school superintendents, who, at the outset, deemed Arbor Day an obtrusive innovation, was expected and occasioned no discouragement. Many State officials who at first were apathetic have on fuller information worked heartily for the success of Arbor Day. The progress of this movement has been remarkable. Arbor Day is now observed in forty States and Territories of the United States, and also in the Provinces of the Dominion of Canada, in certain districts of England, Australia, Japan, and South Africa. It has already become the most widely observed and useful of school holidays. Popular interest in this work has been greatly stimulated by the annual proclamations of governors and the circulars of school superintendents sent to every school in the State.

Arbor Day has fostered love of country, and has become a patriotic observance in those Southern States which have fixed its date on Washington's birthday. The custom of planting memorial trees in honor of Washington, Lincoln, Grant, Garfield, and other patriots and also of celebrated authors and philanthropists, has become general. Now that the national flag with its forty-four stars floats over all the school-houses in so many States, patriotism is effectively combined with the Arbor Day addresses, recitations, and songs. Who can estimate the educational influences, especially in regard to the beauty, utility, and growing value of trees and forests, exerted

upon the millions of youth who annually participate in these exercises? The public appreciation of trees and forests has been greatly increased by the many productions in prose and verse which the most eminent authors of America, like Holmes and Whittier, have written expressly for use on Arbor Day. What growth of mind and heart has come to myriads of our youth as they have pondered and recited or sung these rich gems of our literature, and, still better, applied them by planting and caring for trees.

Trees and tree culture are now the subjects of object-lessons in our best schools. Such lessons lead youth to study and admire our noble trees and realize that they are the grandest product of nature.

One of the educating forces of Arbor Day begins where children start little nurseries at home, plant tree seeds, acorns, nuts, and pits, and observe the wonderful miracles which the tree life is working out before them, transforming soil and inert matter into living forms of surpassing beauty and fragrance. The trees which children plant around the homestead and watch from seed will be increasingly prized as they grow into living memorials of happy youthful days.

Much as Arbor Day has done on limited school grounds, far greater improvements have been made on the homesteads and the roadsides. The work already accomplished will make thousands of roads attractive by trees. In many countries of Europe the road is lined with trees for hundreds of miles on a stretch. Growing on lands otherwise running to waste, such wayside trees yield satisfactory returns. The shade and beauty, grateful to every traveller, are doubly so to the planter, as thousands of farmers can testify. In tree-planting, the economic and ornamental touch at many points.

Will it pay the average farmer to plant trees? Certainly not, if early profits are essential. Future profit can be realized by planting trees in waste places on hillsides and in ravines too steep and rocky for cultivation, along the brook, and by the river-bank. Worn-out and exhausted plains have often been thus rendered of value.

In New England, and all the Atlantic States, there are large areas of barrens, worthless for field crops, that may be profitably devoted to wood-growing. Our Atlantic sand plains that were once covered with woods can be reforested. Over ten thousand acres on Cape Cod which thirty years ago were barren sand plains are now covered with planted forests. Hon. Joseph S. Fay's two hundred acres of fine forest at Woods Holl, Mass., and the three hundred acres of planted trees of H. G. Russell, of East Greenwich, R. I.,

both formerly barren sand plains, are genuine object-lessons for the Atlantic States. Attention should be called to the celebrated forest of Fontainebleau, in France, which covers an area of sixty-four square miles. The soil is composed almost entirely of sand. Jules Clare, an eminent student of forestry, says, "the sand here forming ninety-eight per cent. of the earth, it would be a drifting desert but for the trees growing and artificially propagated upon it."

The village-improvement movement was started nearly thirty years ago, and has spread across the continent. The chief object of the improvement societies is to make the environment of the home and the town healthful and attractive. The homes of our workingmen far surpass in comfort and taste those of the same classes in any other land. Improvement societies are helping in this grand result. Their influence has not been limited to the towns or counties where they have been organized, for the discussions they have prompted have benefited many towns where no improvement societies have yet been formed. The frequent editorials of the New York *Tribune* have been especially influential. Nearly twenty thousand copies of its village-improvement pamphlets have been circulated in response to orders received every week since its publication, less than three years ago.

These improvement societies often serve the same purposes as boards of trade in large cities, favoring good-fellowship and co-operation and the adoption of a non-partisan policy in local affairs. They foster a local pride and public spirit which invite liberal thoughts and generous gifts. They put to every citizen the question, "What do I owe to my town? What is my duty, or rather my privilege, to do for it?" Under such appeals, large gifts are made, not only by citizens but by natives now non-residents. Already many large gifts for parks, libraries, fountains, memorials —halls, schools, and other institutions—and prizes for the planting of roadside trees have come from them, often as pleasant surprises.

# THE NECESSITY FOR STATE FORESTRY ASSOCIATIONS.

By B. S. Hoxie, Evansville, Wisconsin.

[Read at World's Fair Congress, October, 1893.]

It is now twelve years since the American Forestry Congress was called into existence—not for personal gain or aggrandizement, but out of purely benevolent motives. The men who conceived the idea of this association were persons of experience, men who had watched the onward march of civilization and the wanton destruction of most of our primeval forests. Many of them well knew that how to get rid of the timber and to fit the land for agricultural purposes was formerly the great desideratum. Indeed, within the memory of persons now present "logging bees" were scenes of no unusual occurrence. "Boys, we must clear the farm," was the stirring cry. The heavily timbered country and the slow increase of our population in the early days made this the only method to subdue the earth. Except for the wants of settlers in limited areas, there was then no market for timber.

Lumbering forty and fifty years ago began to be an important industry in the Eastern and in the New England States. Maine, New Hampshire, and Pennsylvania were then the scenes of the greatest activity. But westward, ho! Later, Michigan, Wisconsin, and Minnesota, with their vast forests of pine, began to yield the wealth of timber. The older States have already ceased to yield a profitable supply of lumber to large companies. The rapid increase of our population, remote from the supply of building material, has made the lumber business one of our most important industries, until now it is estimated that the annual product of wood material of all sorts consumed in the United States may be valued in round numbers at $1,000,000,000, representing about 25,000,000,000 cubic feet of wood, or the annual increase of the wood growth of 500,000,000 acres of forest. The products of our mines, the value of our wheat and other crops, are of minor importance compared to our timber resources. There are some who assert that in our country there never will be a lack of wood or timber, and by way of argument cite the rapid growth of young timber. It can be shown,

however, by carefully collected facts, that this supply is rapidly and constantly decreasing.

There is a misconception in the minds of many as to the work and aim of the Forestry Congress, or rather of the American Forestry Association, and in telling what its aims and objects are I will dwell upon the necessity for a State Forestry Association in each State in the Union. Its aim is to promote a more rational and conservative treatment of the forest resources of this continent and the extension of forest growth wherever for climatic or other reasons such seems desirable. It therefore invites owners of timber and wood lands especially to join its ranks for their own benefit. The Association has no desire to prevent the legitimate use of forest growth, but desires that it be so managed as to improve and increase its value.

The wanton destruction of woods and of forest material called this society into existence. Its founders considered that a sufficient supply of home-grown wood material was desirable in the household of a nation; that the forest cover on hillsides and mountain slopes had an important relation to water flow and to favorable soil conditions. It recognized the fact that climatic conditions were ameliorated by timber belts. Its members have shown that vast tracts of land otherwise worthless can be made sources of income to the State under forest culture.

Besides the American Forestry Congress there are in Pennsylvania, Ohio, Michigan, Minnesota, and other States local forestry associations, all having similar aims. Through organized efforts several States have lately passed laws having for their object the preservation of the timber of the public domain. Inducements have been given to private owners of timber lands to co-operate and act in harmony in reforesting waste and unproductive lands. Some of the owners of the largest tracts of timber lands in the State of Maine several years ago saw the necessity of preserving the forest growth. Stringent laws were passed by the legislature regarding fires, and the lumbermen and land-owners interested themselves in the enforcement of these laws. Some of these lands thus protected for twenty years or more are now yielding fair returns to the lumbermen. This is not, however, like the original growth of white pine, which took two hundred years to produce; for in many instances a hard-wood growth has taken the place of the pine of the primeval forest. There are, however, thousands of acres of second-growth pine in that State which is producing timber of good, fair quality for packing cases, and their manufacture is now quite an im-

portant industry in that State. This is an example of one of the results of organized effort.

The increase of the consumption of timber is out of proportion to the increase of its growth, but this need not be the case if by agitation by associations proper laws are enacted and enforced with regard to forest conservation; except perhaps in certain kinds of wood. Indiana, once heavily wooded, is now, like Ohio, largely denuded. It has taken less than fifty years to reduce the woodland area below twenty per cent. in that State. The valuable hard woods of Indiana, especially its oaks, hickories, and walnuts, were unequalled in quantity and size and have given rise to wood-working industries in the State which, in 1886, produced more than $30,000,000 worth of manufactures. At present the walnut and poplar are practically gone; white oak is rapidly diminishing and growing poorer in quality, and the virgin growth is everywhere culled of its best timber. Over a half million acres of this are wasted lands only fit to grow timber.

It is a well-known fact that timber trees of the common white pine, which are at their best in our State, Wisconsin, are from 150 to 200 years old, and that this quality of timber is fast receding before the woodman's axe. The three great lumber States are now eating up their forests at a rate which will soon kill the goose that lays the golden eggs. Black walnut, so common twenty years ago, has become so scarce that the use of it has had to be discarded almost entirely for commercial purposes. The poplar or white wood is going the same way, and this, too, will soon become extinct, as it is found only in small areas of our country. It was only a few years ago that the lumbering interests of our State drew its supply from the vicinity of Green Bay and the middle portion of our State, but it is now mainly cut in the northern counties and at much greater expense than formerly.

The cutting down of the forests is not the worst feature, it is the utter neglect to preserve the forest floor so that other growths may take its place. Fires destroy the young growths and burn up the forest floor—the accumulation of ages—in many instances down to the sand or gravel bed, leaving the land bald and sterile for years before vegetation of any kind can exist. The facts mentioned for Wisconsin are true, in part, of every State. They form one great argument for the necessity of forestry associations. By such organizations the enlightenment of the public can be made possible. Trees planted in Nebraska, Kansas, and in Southern

Dakota ten and fifteen years ago, even as small farm plantations, are now yielding wood and small timber fit for domestic purposes, besides affording wind-breaks around farm buildings. Every farm in my own State or in any State where trees can grow should have a few acres of timber.

The public timber lands remaining ought not to be sold or otherwise disposed of, but should be placed under competent forest management. The community can afford to forego profit from such management in the present for the sake of insuring the future. State governments may secure and reserve for forest purposes such woodlands as exist or lapse for non-payment of taxes into their hands, and thus make a beginning for the future. Counties, towns, and smaller communities may for their self-protection reserve, as some land-owners in Massachusetts have begun to do, tracts of forest lands which eventually may also become immensely valuable in timber production. Such forest reserves will form the nucleus and beginning for the education of foresters and establishment of object-lessons in forestry.

Most urgent is the protection of forest property against fire. Aside from the indirect interest which the community has in maintaining desirable forest conditions, it is its fundamental duty to protect property, a duty that it unquestionably owes to the owners. Immediate action by associations of the people should bring such matters of public interest to the attention of the law-making power. One great aid at present is the interest awakened by Arbor Day exercises in our public schools. The children are learning to know about trees and forests and their value. With this lever in our hands, our State Forestry Association will work in harmony with other societies and the superintendent of schools to bring not only sentiment but facts to aid in the work of saving God's first temples.

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## THE AMERICAN FORESTRY ASSOCIATION—ITS AIMS AND ACCOMPLISHMENTS.

By Hon. Warren Higley, of New York, N. Y.

[Read at World's Fair Congress, October, 1893.]

In popular governments great reforms can be wrought only through public sentiment. Agitation is the leaven, and combined

action the force, which, in a just cause, conquer error with truth, and firmly establish beneficent principles among mankind. In the realms of economics, no less than in the fields of philanthropy, victories are won through the devotion of a few enthusiastic and persistent leaders, with whom discouraging environments count for naught.

The annual utilized product of the forests of the United States is second only in value to that of agriculture. It exceeds, by a conservative estimate, one billion dollars; and this enormous consumption, increasing largely from year to year, far exceeds the forest increment. Therefore, the capital upon which this product depends is gradually disappearing, and under existing conditions must be swept away in the not very distant future.

When we consider, in this connection, the beneficent influences of forests upon civilization, the grounds for alarm are increased manyfold, and the warnings of the agitator have added significance. But widespread, counteracting influences have been actively at work the last two decades, educating the people and inspiring Congresses and legislatures toward forest protection and the establishment of systems of forest management adapted to the conditions and needs of our diversified country.

The American Forestry Association, organized and for seven years continued under the name of the American Forestry Congress, has accomplished more in the direction of arousing public interest and securing legislative enactments for the preservation and conservation of our forests than any other instrumentality. Its origin is unique, and forcibly illustrates how great reforms are instituted and afterwards carried on through the efforts of a few earnest workers.

Among the guests invited by the Government of the United States to participate in the centennial anniversary, in the autumn of 1881, of the surrender of Lord Cornwallis at Yorktown, Va., were Baron Richard Von Steuben, a distinguished Prussian forest official, and six officers of the Prussian Army, bearing the name of Von Steuben, representing the family of General Von Steuben of the American Revolution. After the celebration at Yorktown the Von Steubens were given a public reception at Cincinnati, Ohio, in which many of the prominent citizens of that place took part.

In a conversation between the forest official and Judge Warren Higley, one of the reception committee, and others, a discussion arose as to the rapidity with which our American forests were disappearing, and the prevailing lethargy of the people on the subject

of forestry, and a comparison was drawn with the systems of forestry practiced in Europe. The seed thus sown took root, and a conference, held at Judge Higley's office about the first of January following, at which Col. William L. DeBeck, a prominent newspaper correspondent, was present, resulted in the determination to hold a convention in that city for the promotion of forestry in America.

Under a call through the papers, a meeting was soon after held at the Gibson House, in which many prominent citizens took an active part, and organization was effected for the preliminary work of the proposed convention, with the following officers: President, Hon. John Simpkinson; Vice-Presidents, Hon. Wm. S. Groesbeck, Judge Alphonso Taft, Reuben R. Springer, Esq., Murat Halstead, Esq., Richard Smith, Esq., Ex-Governor J. D. Cox, Hon. Fred. Hassanrek, and Rev. Dr. I. W. Wiley, Bishop of the M. E. Church; Secretary, Col. Wm. L. DeBeck; Advisory Board, Judge Warren Higley, Judge J. W. Fitzgerald, Prof. John B. Peaslee, Supt. Public Schools; Ex-Governor E. F. Noyes, and the Rev. Dr. Max Lilienthal.

The Scientific Branch Committee consisted of: Chairman, Judge Warren Higley; Secretary, Alfred A. Springer, M. D.; Members, Dr. John A. Warder, Prof. F. W. Clarke, Prof. Adolph Leue, Prof. John B. Peaslee, and Rev. Dr. Max Lilienthal.

Weekly meetings were held through the winter, the proceedings of which were extensively published in the daily press. Under the impulse thus given, a county association was formed, which resulted in the adornment of private grounds and public highways in the various townships of the county by the planting of trees, and a widespread interest was aroused throughout the State and the country by the publication of these proceedings and articles pertinent to the subject of forestry.

A National Forestry Convention was appointed to be held at Cincinnati, to begin April 25, 1882, and continue five days. Invitations were sent out to persons interested in the subject of forestry throughout the United States and Canada, urging their attendance and co-operation; and the Governor of Ohio, being duly authorized by the legislature, appointed the 27th day of April, 1882, as Arbor Day, and recommended its observance throughout the State.

Pursuant to the previous arrangements of the local committee, the first session of the American Forestry Congress met in Springer Hall on the morning of the 25th of April, 1882. Distinguished representatives from the different States and the Canadas were present.

Ex-Governor E. F. Noyes was chosen temporary chairman, and the following gentlemen were appointed a committee on permanent organization: Dr. Franklin B. Hough, Dr. John A. Warder, Dr. Geo. B. Loring, Gen. C. C. Andrews, John H. McMacken, Esq., Hon. Warren Higley, Dr. John M. Walden, Prof. Wm. Saunders, Gen. Durbin Ward, and Dr. A. A. Springer.

A general meeting of the Congress was held in the evening, at which Gen. Durbin Ward, in the absence of the mayor of the city, welcomed the delegates and other strangers, and cordially extended the hospitalities of Cincinnati. He was followed by Gov. Charles Foster in an eloquent address of welcome on behalf of the State of Ohio. Other speeches followed. The committee on permanent organization reported a constitution, which was adopted, and the following officers were elected to serve during the ensuing year: President, George B. Loring, Salem, Mass.; Vice-Presidents, one from each State and Territory, and each province of Canada; Recording Secretary, W. L. DeBeck, Cincinnati, Ohio; Corresponding Secretary, D. D. Thompson, Cincinnati, Ohio; Treasurer, John A. Gano, Cincinnati, Ohio.

President Loring then delivered a carefully prepared and eloquent address, and this closed the first session. Thus was the American Forestry Congress organized and launched on its useful career. There were eighty-seven papers presented during the remaining four days of the Congress, the most important of which were published in the daily local papers and extensively copied throughout the country. Many of them were afterwards published in reports of Agricultural Societies, and especially by the Government of Canada in its horticultural report for the following year.

### *Arbor Day.*

An important feature of this first meeting of the Congress was the celebration of Arbor Day, under the direction of the committee of arrangements. It had been decided to plant memorial trees in the principal parks of the city, with appropriate ceremonies. The principal celebration, however, was made in the new Eden Park, where had been previously located, under the direction of the noted landscape gardener, Adolph Strauch, the various groves to be planted, which were named and dedicated, "Pioneer's Grove," "Citizen's Memorial Grove," "Author's Grove," "President's Grove," etc.

Trees had been selected from various parts of the country and

from Europe and planted in the groves for which they were intended. "Author's Grove" embraced six acres, and was set apart for the planting of groups of memorial trees by the pupils of the public schools in honor of distinguished authors.

On the morning of April 27 the military, under command of Col. S. A. Whitfield, the school children, formed in companies of Forestry Cadets with their teachers, and a large number of citizens marched to Eden Park for the dedicatory ceremonies. Banners bearing in green the device of an oak leaf and the words "Welcome Foresters" were displayed by thousand—50,000 citizens covered the grassy slopes and crowning ridges to witness the novel scene. At the firing of the signal gun the various groves were planted and dedicated with loving hands and appropriate ceremonies. Then the multitude assembled around the grandstand and listened to speeches from ex-Governor E. F. Noyes, Hon. Cassius M. Clay, Gen. Durbin Ward, and Dr. Loring, then U. S. Commissioner of Agriculture.

I have dwelt thus fully upon this celebration of Ohio's first Arbor Day because this was the first public planting of memorial groves in America, if not in the world, in honor of statesmen, authors, soldiers, and distinguished citizens, and because from it a wide-spread influence and powerful sentiment went forth in favor of planting and caring for trees.

### Montreal Meeting.

On the last day of the session it was agreed that the Congress should meet at the city of Montreal, Canada. Accordingly, on the 21st and 22d days of August, 1882, the second meeting of the American Forestry Congress was held at Montreal, Canada, and was eminently successful both as to the number in attendance and the work that was accomplished. These very desirable results were due to the energy and zeal of Mr. Wm. Little, Vice-President of the Congress for Canada.

It was there deemed advisable to amend the constitution, and Mr. B. E. Fernow, the present efficient Chief of the Forestry Division of the Department of Agriculture, as chairman of the committee, reported the amended constitution, which was adopted, and which in Article II defines the objects of the Association as follows:

"The objects of this Congress shall be the discussion of subjects relating to tree planting, to the conservation, management, and renewal of forests; the climatic and other influences

that affect their welfare; the collection of forest statistics, and the advancement of educational, legislative, or other measures tending to the promotion of these objects. It shall especially endeavor to centralize the work done and diffuse the knowledge gained."

### What has the Association Accomplished?

Recognizing the great educational force exerted through the observance of Arbor Day by the public schools and citizens of the country, the Association has labored persistently through its Arbor Day committee, of which the Hon. B. G. Northrup has been the chairman from the first, to secure its permanent adoption by the several States and Territories. The zeal with which the committee has pursued this object is evidenced by the fact that Arbor Day is now celebrated in 45 States.

Up to the time the American Forestry Congress was organized, tree planting had been encouraged only by the authorities of some of the prairie States for economic purposes. The legislatures of Minnesota, 1871, and Illinois, 1874, offered a bounty; Iowa, 1872, exemption from taxes; Dakota, 1877, bounty and exemption from tax; Nebraska, in 1872, through its State Board of Agriculture, inspired the planting of millions of forest trees on the appointed day. This action was taken at the instance of Lieut. Governor J. Sterling Morton, and was following a patriotic proclamation of the then Governor R. W. Furnas, the first Arbor Day proclamation issued by the governor of a State. The impetus thus given has continued, until to-day many hundreds of thousands of acres in Nebraska are covered with waving forests. Other prairie States followed the example of Nebraska with similar results. Immediate necessity was the moving cause, and the benefits to those States are incalculable.

The Cincinnati plan introduced the celebration of Arbor Day into the schools, and inculcated a widespread sentiment through the planting of memorial trees and groves, which has led to the education of the people in the subject of forestry, given increased interest in tree growth and forest preservation, and prompted legislators to consider and, in some instances, to enact laws in the interest of forestry. There are now twenty-eight States and Territories in the United States that have a legally-established Arbor Day, and in six of these the day is a legal holiday. The time, we trust, is not far distant when it shall be a national holiday.

The Association has endeavored from the first, and in a large

measure succeeded, in interesting in its work representative men and women. Many of the legislatures of the States and the Government of Canada have sent delegates of their most distinguished citizens to attend its annual meetings and take part in the deliberations, and the Agricultural Department of the United States has taken a very active interest in the work of the Congress from the very beginning. It was recognized as the popular sustaining force for the promotion of the work in the Forestry Division—the avenue through which legislation could best be secured.

For several years the particular subjects for discussion were chosen with a view to most benefit the section of country within which the annual meeting was held. The results generally proved most gratifying. By way of illustration I refer to the annual meeting of the Congress held at Boston, September 22d, 23d, and 24th, 1885, under the auspices of the Massachusetts Horticultural Society. Its work was planned and programs arranged with special reference to the forest conditions and needs of New England.

California and Nebraska, as well as the Canadas and the nearer States, sent delegates of their most distinguished citizens to this meeting. The General Government was represented by the Commissioner of Agriculture. The papers, discussions, and proceedings of the sessions were published generally in the leading papers of New England, and afterwards many of them were published in the agricultural journals of that section, as well as in a special volume of Proceedings.

The following committee was appointed on New England Forest Policy: Gen. Chas. Hamlin and John E. Hobbs, of Maine; Wm. S. Ladd and Geo. B. Walker, of New Hampshire; Francis H. Appleton and Wm. C. Strong, of Massachusetts; Henry G. Russell and Chas. W. Smith, of Rhode Island; T. S. Gold and B. G. Northrup, of Connecticut; Redfield Proctor and Hiram Cutting, of Vermont.

New England was awakened as she had never been before to the importance of protecting and conserving her forests. Within two years her six States established, and have ever since celebrated, Arbor Day after the Cincinnati plan. Other valuable and pertinent legislation in the interest of forestry may be claimed as directly or indirectly the result of the interest incited by this meeting at Boston.

In no direction, however, has the work of the Association been pursued with more directness and persistence than in trying to influence the National Congress to pass laws deemed necessary to the protection and management of the national forest domain.

Petitions and resolutions were presented to both branches of our National Legislature, and laws were formulated and pressed for passage by the committee on legislation year after year without any decided success, and yet not without encouragement from Senators and Congressmen.

Soon after the meeting of the Forestry Congress at Atlanta, Ga., in the early winter of 1889, a committee, appointed for the purpose, waited upon President Harrison and presented a memorial urging the adoption of an efficient Government policy for the preservation and protection of the public forests, and urging the President to call the attention of Congress to the subject with favorable recommendations. The President graciously complied with this request. In October following, at the annual meeting of the Forestry Congress, held at Philadelphia, a petition to Congress was adopted, urging the enactment of a law withdrawing from sale all forest lands belonging to the nation, and committing them to the custody of the army, until a commission should determine what portions of them ought to be kept permanently in forests for the public welfare. The following year, 1890, Congress passed a law empowering the President to establish by public proclamation such reservations of forest domain as, upon recommendation by the Secretary of the Interior, he might deem necessary to the public welfare. The area of the permanent forest reservations, proclaimed under this law by President Harrison, aggregated nearly 13,000,000 acres, and lately President Cleveland added to them nearly 5,000,000 acres more.

There is a bill now pending before Congress which the American Forestry Association suggested and has strongly advocated providing for a practical system of forest management for these Government Forest Reservations and it is confidently hoped that Congress will, in the near future, give adequate legislation putting into effect a sound, practical, forest policy for the wise management of all our national forest domain, now estimated at about 50,000,000 acres. To this end has the Forestry Association long been striving, and we feel that we can now look forward with confidence to its accomplishment in the not very distant future.

Prof. B. E. Fernow, Chief of the Forestry Division, U. S. Department of Agriculture, in his report for 1892, says: "We may, then, before the end of the century, expect to see the first phase of the history of forestry development in the United States ended, by having the Government fully committed to a sound forest policy.

Such a policy will induce imitation on the part of smaller communities, and finally of private landlords, especially as with the settlement of the country greater stability will lead to permanent investments and induce conservative management, when also with the rapid destruction of virgin supplies the profitableness of forest management will have become more apparent."

The influence of the American Forestry Congress (changed to "Association" in 1889) is also apparent in the forestry legislation of many of the States, in the direction of establishing great forest preserves or parks, of such portions of their domain as are deemed necessary to the water supply and climatic conditions, and placing them under the management of State Forest Commissions.

New York has outlined a State Park in the Adirondack mountains which embraces about three million acres. Of this the State owns about 600,000 acres, and purposes to own or control the balance, to the end that this vast area shall be forever devoted to forest preservation. The State owns also about 400,000 acres in other parts of the State, including the Catskill Forest Reserve, which have been under the care and protection of the State Forest Commission. The first steps have thus been taken toward the establishment of a practical system of forest management, on a large scale, which shall not only preserve the forest covering over the great watersheds of New York, but will yield a generous supply of wood product for the economic uses of the people, through all time. Other States are preparing to follow the example of New York, notably among these are New Hampshire and Pennsylvania. This work will probably go on until every State in the Union shall have its Forest Reserves under practical forest management. Private interests also have been stimulated and local forestry associations formed throughout the country, while the parent association has grown in strength and influence, and in this centennial year promises to enter upon a still more successful career.

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